Jewelry Recommender System

1000ml

By: Arash Aghagol

Part 1

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OBJECTIVES

OBJECTIVES

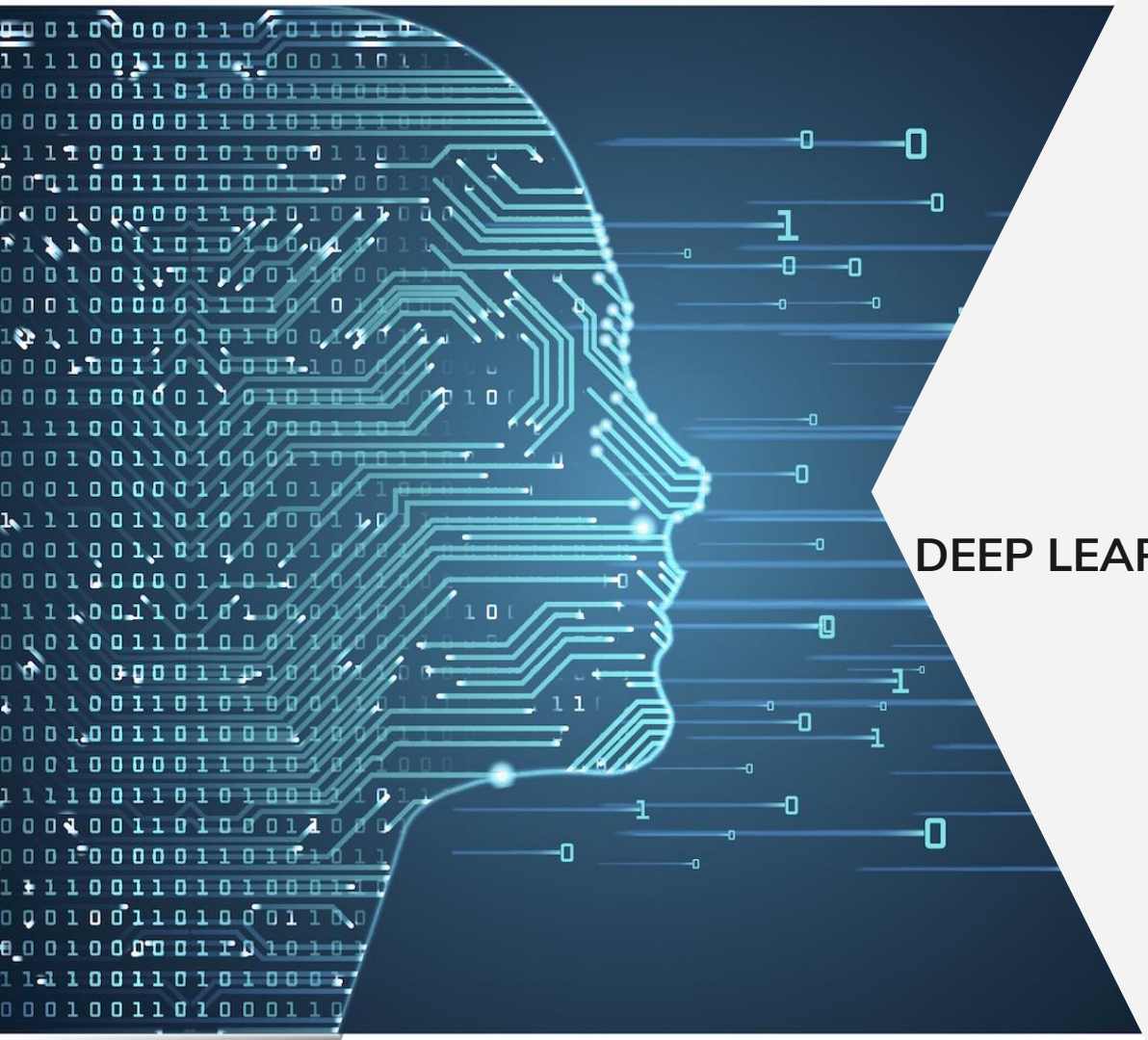
- Image classifier
- Generalizes well with the unseen data

02

GENERAL INFORMATION

GENERAL INFORMATION

- Initially 1270 Images
- 4 Categories
- Found 13139 more images
- Various backgrounds



03

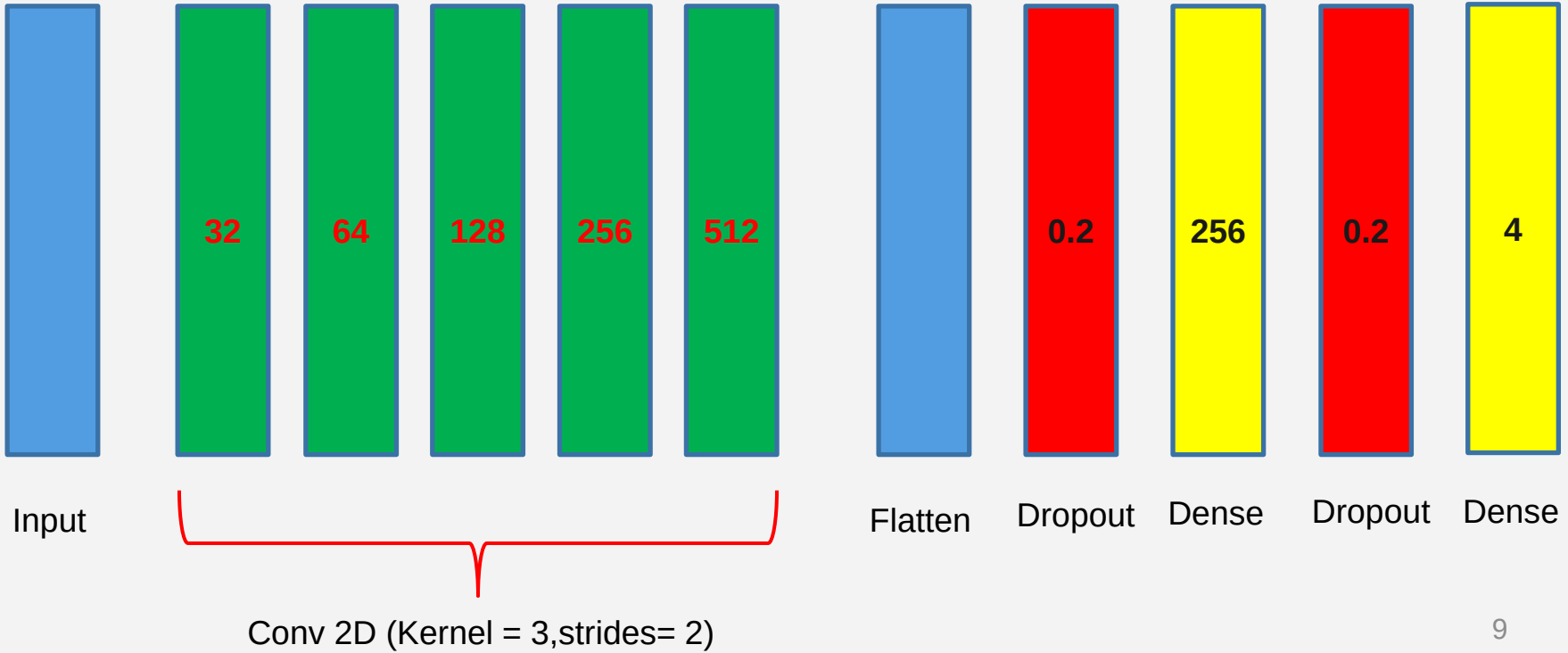
DEEP LEARNING MODEL

MODELLING STEPS

- Loading the images
- Dividing images (Train, Validation and Test)
- Creating layers
- Tuning hyper parameters
- Evaluating results

LAYERS

Activation= RELU



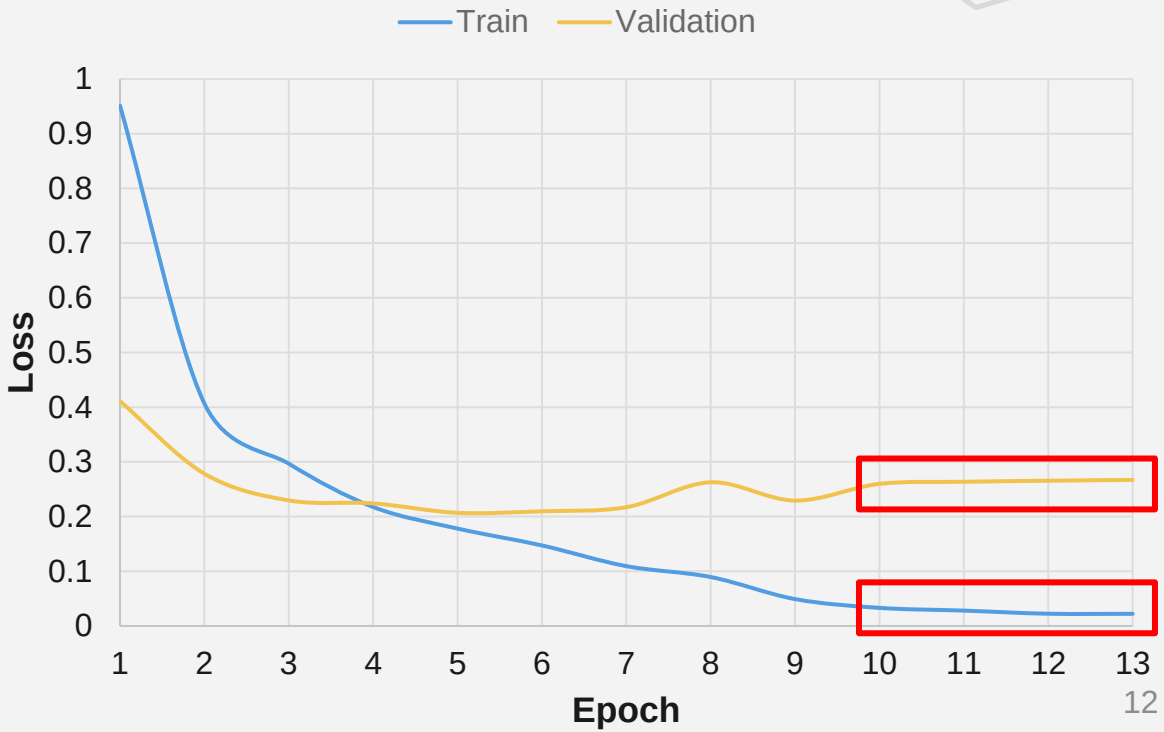
04

RESULTS EVALUATION

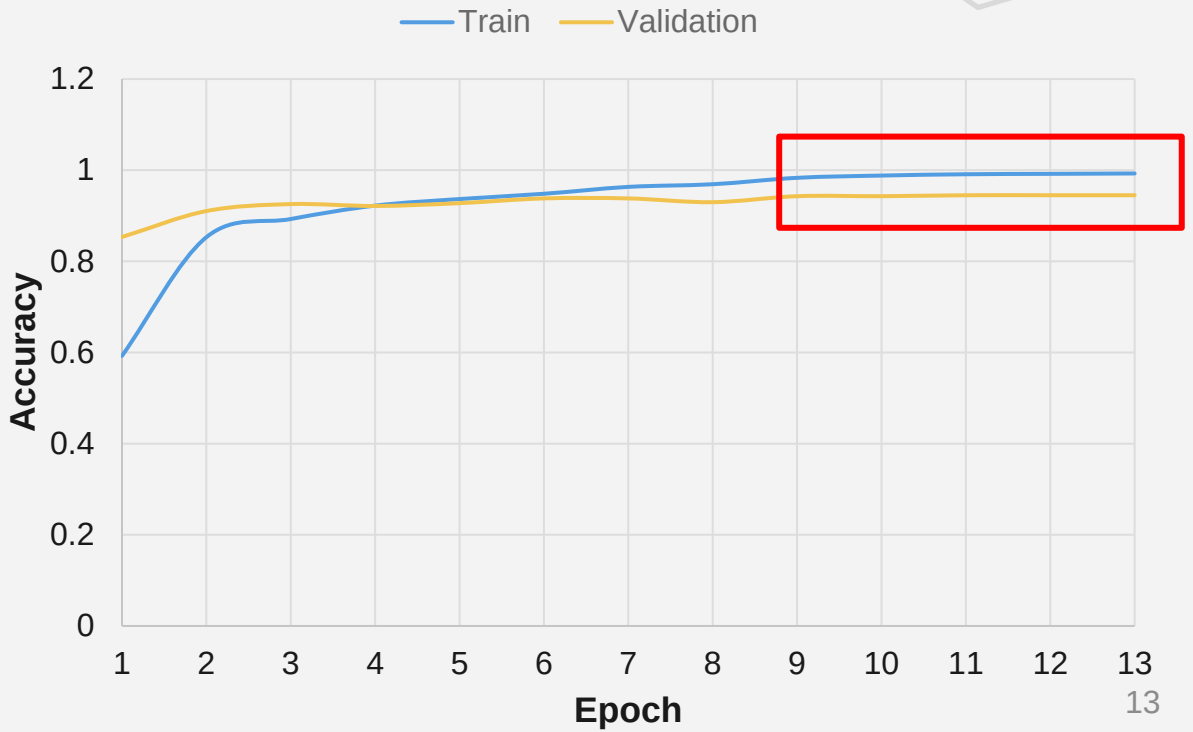
TECHNICAL DETAILS

- Solver: Adam
- Loss: sparse categorical cross entropy
- Early stopping used
- Automatic learning rate reduction

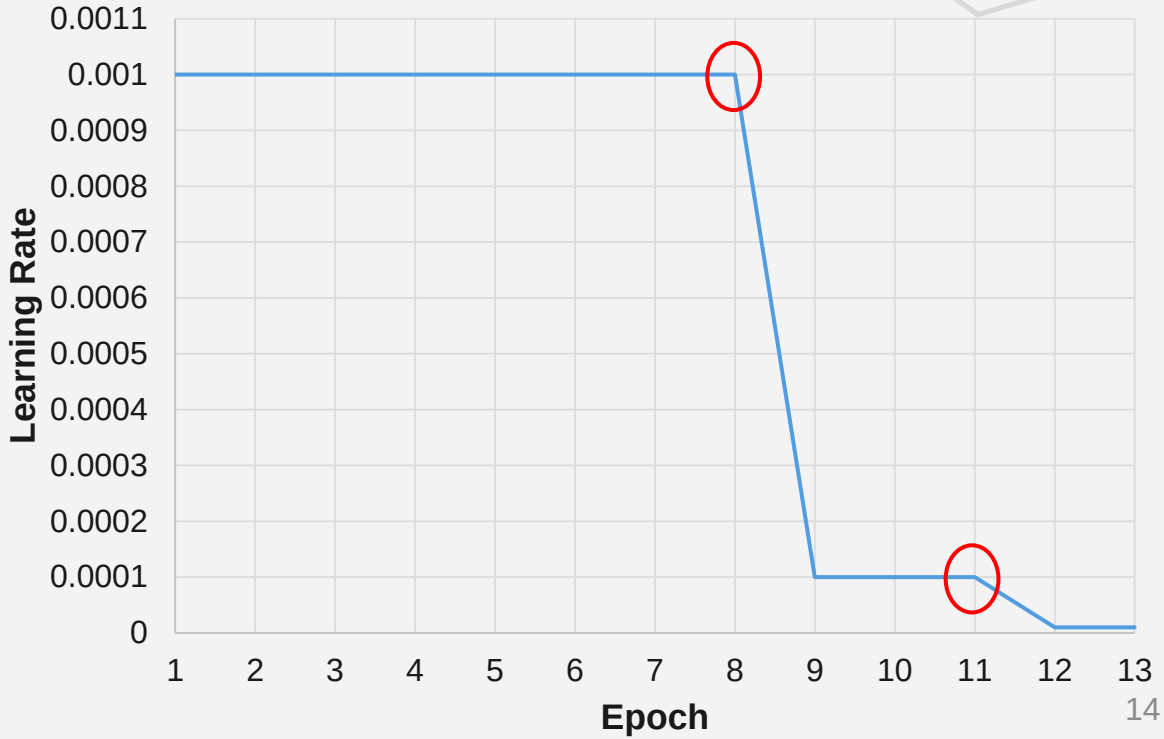
CONVERGENCE (LOSS)



CONVERGENCE (ACCURACY)

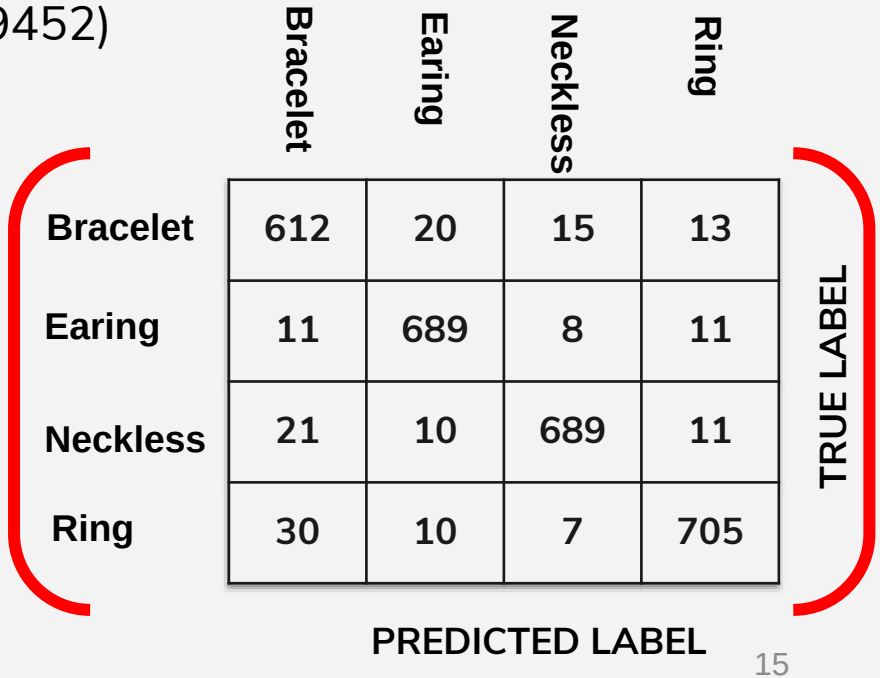


LEARNING RATE



TEST DATASET ACCURACY

- Test Accuracy: 0.9351 (Validation: 0.9452)
- Test Size: 2882



MISCLASSIFIED EXAMPLES

Predicted Category: Ring
True Category: Bracelet

Predicted Category: Necklace
True Category: Earrings

Predicted Category: Ring
True Category: Bracelet

05

SUMMARY

SUMMARY

- Jewelry image classifier created
- Model generalized well
- Misclassification investigated

Jewelry Recommender System

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Part 2

SUMMARY OF WORKED DONE

- Jewelry image classifier created
- Model generalized well
- Misclassification investigated

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01 OBJECTIVES

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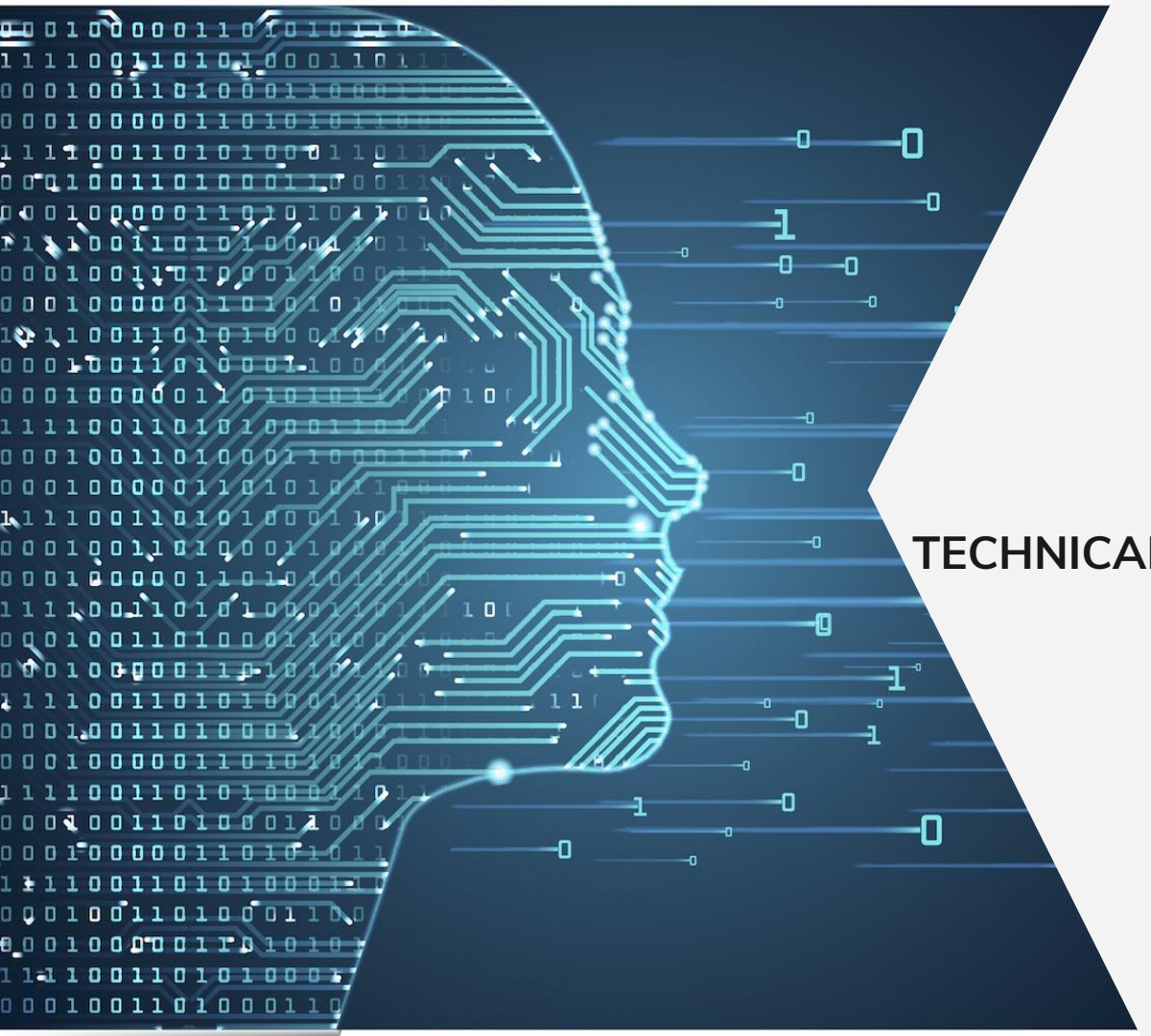
01

OBJECTIVES

OBJECTIVES

- Jewelry image recommender system
- System deployment
- Some recommendations for future work



02

TECHNICAL EXPLANATION

SYSTEM CREATION STEPS

- Image clustering
  - Baseline clustering
  - Deep learning improvement
- System deployment

IMAGE CLUSTERING

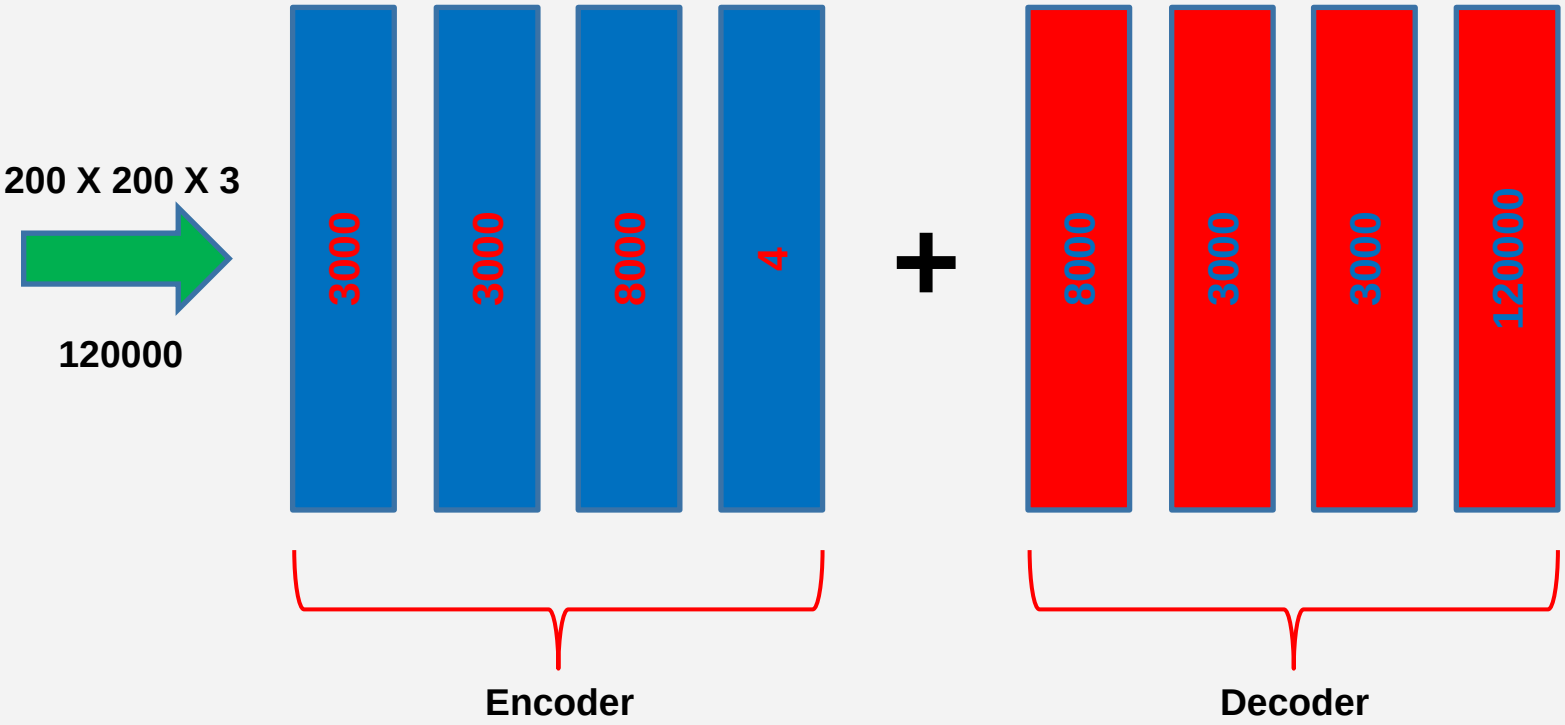
- Finding sub-groups within each jewelry type
- Baseline image clustering
  - KMeans
  - PCA + KMeans
- Final clustering system
  - Autoencoder + KMeans

AUTOENCODERS

- Nonlinear dimension reduction
- Autoencoder= Encoder + Decoder
- Four separate autoencoders

AUTOENCODERS

Activation= RELU



CLUSTERING RESULTS
(SILHOUETTE SCORE)

		Bracelet	Earrings	Necklace	Ring
Baseline	**KMeans**	0.13	0.16	0.2	0.26
	PCA + KMeans	0.15	0.17	0.22	0.40
Final	**Autoencoder + KMeans**	**0.71**	**0.67**	**0.60**	**0.86**

SYSTEM DEPLOYMENT

- Serialize the final models
- Building a simple front end
- Creating web application
  - Deserialize the models
  - Connecting the webpages to the backend
  - Testing

03

DEMONSTRATION

04

TAKE-AWAYS AND BARRIERS

BARRIERS

- Unfamiliar to HTML
- New to flask
- Frontend and backend connection
- New to unsupervised deep learning
- Autoencoders high memory usage

TAKE-AWAYS

- Learned HTML
- Good grasp of flask
- Web templating system
- Nonlinear dimension reduction techniques
- Running flask app on Colab

05

SUMMARY AND FUTURE WORKS

SUMMARY

- Jewelry recommender system developed
- System deployed

FUTURE WORKS

- AWS EC2 deployment
- Building a chat bot

THANKS

Does anyone have any questions?